Originating Office:	Document Description:	Project Lead/Reviewer	Reviewing Office:	Date of Review:
AIR-130	TSO-C209	Dara Gibson		

Commenter	Section # and Page #	Comment	Suggested Change and Rationale	Disposition
Bernie Newman, ACA	3.a, page 1	The term "application" is broad and is not used in the AS6296 to describe the functional aspects that would be covered by this AS.	In sentence starting "This TSO covers", replace "application" with "functional". In sentence starting "Specific applications", replace "applications" with "functional requirements"	Accepted. Paragraph 3.a. has been changed to the following, "This TSO's standards apply to equipment intended for use as an electronic display in the flight deck by the flight crew in 14 CFR Part 23, 25, 27, and 29 aircraft. This TSO covers basic display standards (SAE/AS8034B) and specific displayed functions requirements (SAE/AS6296). Specific displayed functions can include, but are not limited to, flight instrumentation, navigation, engine and system status, alerting, surveillance, communication, terrain awareness, weather, and/or other displays. This TSO does not provide standards for head-up displays. Two functions covered within SAE/AS6296 are required as a minimum. This TSO does not address sensor requirements. This TSO does not address the display of single function equipment (e.g., airspeed). Sensor requirements

Originating Office:	Document Description:	Project Lead/Reviewer	Reviewing Office:	Date of Review:
AIR-130	TSO-C209	Dara Gibson	-	

2.	Bernie Newman, ACA	3.a, page 1	Sentence starting "Two functions" should be qualified with the where they come from, specifically AS6296	Replace "Two functions are required" with "Two functions identified in AS6296" are required"	and single function equipment requirements are located in their respective TSO." Accepted. See response to comment 1.
3.	Bernie Newman, ACA	3.b, page 2	The sentence starting "Document the loss" is taken from C-113a, but a suggested improvement would be to bring in the notion of Design Assurance Level as has been done for recent TSO's such as C-194 or C-198 which introduce the topic of design assurance level.	Rationale: This TSO is specifically aimed at EFIS, so doesn't have quite the broadness of TSO-C113a. Suggestion: Replace the sentence starting "Document the loss" with one of the two following forms: "Develop the equipment to, at least, the design assurance level equal to the failure condition classification due to loss of function and malfunction." Or (preferred): "You may utilize the functional hazard assessment process outlined in SAE ARP 4761, Guidelines and Methods for Conducting the Safety Assessment Process on Civil Airborne Systems and	Not accepted. The language used in paragraph 3.b is boilerplate and consistent with Order 8150.1C.

Origina AIR-13	ating Office: 0	Document Descripti TSO-C209	on:	Project Lead/Reviewer Dara Gibson	Reviewing C	Office: [Date of Review:
4.	Bernie Newman, ACA	3.e, page 2	The AC20-115C allows for the any past version of 178 (see e.g. Revise to better account for the previous versions of DO-178C.	appropriate of classification failure condifor which the designed in a paragraph 5. Note, that for there is also another item possibility of 9.b(8)). usage of Rationale: A guidance for well as what systems using than 178B. Suggestion: Replace the "You may all "You may all software to be RTCA Inc. of RTCA/DO-1 the guidance of the systems using that the systems using the syste	178, if you follow e of etc"	interim boi until order published. deviate to a RTCA/DO strongly en use RTCA/	ed. age in the TSO is the ilerplate language 8150.1D is You may request to an older version of 1-178 but it is accouraged that you 1/DO-178B or C.
5.	Bernie Newman, ACA	3.f	The words "RTCA, Inc. Docum RTCA/DO-254" do not need to			Accepted. The italics normal fon	were changed to
6.	Bernie Newman, ACA	4.b	14CFR45.15(b) and AS6296 all manufacturer's name or tradema allowance should exist in the TS	ark. Similar consistent w FO. preferred to	Ithough it's ith the C-113a, it is be consistent with CFR and AS6296.	- 1	ed. 4.a states, "Mark at aajor component

Origin AIR-13	ating Office:	Document Description: TSO-C209		Project Lead/Reviewer Dara Gibson		Reviewing Office:		Date of Review:
					Suggestion: Replace "name" with "name or trademark or symbol"		all the ir 45.15(b) SAE/AS manufac compone trademan requiren are for c easily re tools) and the article	ently and legibly with aformation in 14 CFR § and paragraph 3.14 of 6296." This allows the sturer to mark a major ent with the name, rk or symbol. Marking nents in Paragraph 4.b omponents that are movable (without hand ad for subassemblies of le that you determined interchangeable.
7.	Bernie Newman, ACA	5.a.(4)	If the suggested change of commadopted, then add the need to ide analyzed failure condition classif	entify the fication.	Rationale: for co suggested replace comment #3. Suggestion: In 5.a(4) add a ne	ement text of ew "(d) Failure	Not acce	
8.	Bernie Newman, ACA	6.g, page 5	Related to comment #4, the AC2 allows for the possibility of more 178B or 178C. Revise to account systems using earlier versions of guidance.	0-115C e than just t for legacy that	condition classificationale: to be of the suggestion in Suggestion: Replace "RTCA/RTCA/DO-1780" RTCA/DO-1780" Replace: "includ supporting the apobjectives in RTCA/DO-1780 and Outputs by S	DO-178B or with C, or earlier data oplicable CA/DO-178B as Objectives	Not acce	epted. nt 4 was not accepted.

Origina AIR-13	ating Office: 0			Project Lead/Reviewer Dara Gibson	Reviewing O	ffice:	Date of Rev	/iew:
				178B Annex A, Objectives and Software Level'	ata supporting bjectives of C or RTCA/DO-Process Outputs by or where earlier is used, the data of tware to Support			
9.	Honeywell	Section 3 Page 1	Specific requirements are defined Section's 4 and 5 of AS8034B and later in the document. To remove and the possibility of interpretation AS8034B and AS6296 Section 3 standards are not required, add class	d AS6296 insert "general s ambiguity Between "MOP "qualification a documentation	standards, " 'S" and nd	sections SAE/AS paragrap	d. ove any ambigu 3 and 4 of 66296 were add oh 3. Section 4 B was also add	ed to
10.	Garmin	3 Page 1	This TSO invokes AS 8034B, wh currently already specified by TSO	AS 8034B as the covered in a sep. Additionally, surply how this TSO a are related. For C195b paragrap includes "Class"	is is already parate TSO. aggest explaining and TSO-C113a example, TSO- ph 3.a.(4) A and B orized under this	The note explains docume "The ha optical (EFIS dis SAE AS display in the control of the control		It states, al, and ments of essed in FIS or a

Origina AIR-13	ating Office:	Document Descrip TSO-C209	tion:	Project Lea Dara Gibso	Lead/Reviewer Reviewir		ffice:	Date of Revie	:w:
11.	Garmin	3	The paragraph references the e	ontire	C165a, Electronic Equipment for G Depiction of Airc (Own-Ship) when Surface Applications shall take preceded differs from TSO Revise this section	raphical craft Position implementing ions. This TSO ence where it 1-C165a."		essed in SAE/AS6	6296."
11.	Gariiiii	Page 1	documents of AS 6296 and AS section 3.c only references section document.	8034B, but	only section 4 ap example, section C113a specifies of AS 8034B.	plies. For 3 of TSO-	To remo sections SAE/AS paragrap	ove any ambiguity. 3 and 4 of 6296 was added to bh 3. Section 4 of B was also added.	to f
12.	Garmin	3.a Page 1	"This TSO is not intended to a display of single function equipairspeed). Two functions are reminimum." Clarification is needed on "functions are reminimum."	pment (e.g., equired as a	Suggest revising two of the EFIS fincluded in SAE/required in order to obtain TSOA fince See SAE/AS6296 for more details of "Declaration of EFunctions".	AS6296 are for an applicant for this TSO. 6 section 3.14.1 on the	changed This TSO equipme an electr flight de 14 CFR aircraft. display s (SAE/A) displaye requiren Specific can incluto, flight navigation	d. oh 3.a. has been to the following, O's standards appent intended for us ronic display in the ck by the flight or Part 23, 25, 27, ar This TSO covers standards S8034B) and speed functions nents (SAE/AS629 displayed functionade, but are not liminstrumentation, on, engine and systering, surveilland	oly to se as he rew in nd 29 basic cific 96). ons mited

Origina AIR-13	ating Office: 0	Document Descript TSO-C209	ion:	Project Lea Dara Gibso	ad/Reviewer n	Reviewing C	office:	Date of Review:
13.	Garmin	3.f Page 2	Including this specific DO-254 redundant to the rest of the paragsection. For custom airborne electronic h determined to be simple, RTCA/paragraph 1.6 applies. DO-254 makes it clear how to ac "simple" custom airborne electronardware.	graph in this nardware //DO-254,	Remove this refe 254 Paragraph 1		awarene other dis not provup displicovered are required the series of th	nication, terrain sss, weather, and/or splays. This TSO does ride standards for head- ays. Two functions within SAE/AS6296 ired as a minimum. O does not address equirements. This TSO address the display of anction equipment (e.g.,). Sensor requirements rele function equipment ments are located in pective TSO." epted. guage used in the TSO plate and consistent der 8150.1C.
14.	Garmin	4.a. Page 2	Marking requirements of SAE/A reference section 3.15 of the star is no section 3.15.		Change to 3.14. provides identifi requirements.			d. agraph reference has anged to 3.14.
15.	Garmin	4.a. Page 2	Section 3.14.d of SAE/AS 6296 assumed referenced section of 4. TSO) includes the statement to n	a in the	Exclude section paragraph 4.a of		Not acco	

Originating Office: AIR-130	Document Descript TSO-C209	ion:	Project Lead/Reviewer Dara Gibson		Reviewing Office:		Date of Review:
16. Garmin	4.b.(2) Page 3	with: "See Installation Manual (IM Declared EFIS Functions", or on the primary (most promine component of the EFIS. The Order 8150.1C TSO templa include a statement similar to this include a statement similar to this determined may be interchan. This language is confusing.	r equivalent, ent) te does not is phrase.	Garmin is routine deviations from Trequirements to nequipment with letthe equipment do sufficient space to well as all other markings (e.g., mand SW level, etcother TSOs). This granted through usimilar to the exa 8150.1C ¶ 7-4.e.(Mnl for Addtl TS and/or markings.) The language for requirement is cocould mean that a circuit board need number. Suggest removing or if removing ca work with industry wording that is be understood.	park the engthy text as es not have or include this as equired ultiple TSOs that appear in s deviation is use of a marking emple in Order 4).(b) "See Inst O approvals"). this infusing. This is stuffed printed is the TSO gethe statement uses problems, by to establish	acceptab "See Ins for Decl For exar equipme EFIS Fu This info because multiple displaye function providin Not acce The lang	epted. guage used is tte and consistent with
17. Garmin	5.a.(4)(c) Page 3	Paragraph 5.a.(4)(c) states: (4) For each unique configurations software and airborne electron hardware, reference the following (c) Functional description.	onic	Reword 5.a.(4)(c) (4) For each resoftware and/orelectronic hard reference the features.	ange of or airborne dware,		guage used is the and consistent with

Origina AIR-13	ating Office: 0	Document Description: TSO-C209		Project Lea Dara Gibso	ad/Reviewer on	Reviewing O	Office: Date of Review:		view:
			This language is vague and po difficult to comply with when Appendix A of SAE AS 6296. manufacturers will list a range AEH part numbers that are con approved versus showing each configuration of SW and AEH Additionally, EFIS functionali added in subsequent releases of AEH which can cause a large necessary to be shown in the measily be reduced to a few data	considering Many of SW and mpatible and a unique I that can exist. ty may be of SW and/or amount of data nanual that can a sets.		al description.			
18.	Garmin	5.f Page 4	TSO paragraph 5.f and its subjinctude definition of non-TSO the data to be submitted to the TSO functions. This guidance with Order 8110.4C CHG 4.	functions and ACO for non-	non-TSO functi term "performan definition of a n is inconsistent v 8110.4C CHG 4	onality or ntained in the ated under his TSO (that is, ons)." Use of the nce" in the on-TSO function with the Order paragraph 6- o.(3)(a) guidance o define a non- he issue is non- be defined as It will create e criteria are ole, if a TSO num 10 watt a company	incorpo defines as "one a TSO- perform (MPS), affect t TSO fu technic outside Further 6.9.b.(3 require submit declare	septed. 8110.4C (Chg prated) para 6- a non-TSO for that is not consupproved minute standard, does not supplied he hosting art anction(s), and ally be implemented of the TSO at more, Para (B)(b) of the ones manufactured the manufactured deperformance ments for the	e9.b.(1) unction overed by imum d port or icle's d could mented rticle." der ers to urer's e

Origina AIR-13	ating Office:	Document Description TSO-C209	n:	Project Lea Dara Gibson	Lead/Reviewer Reviewing son		ffice:	Date of Review:
19.	Cormin	6 0	There is a cogond reference to D	O 179D but	at 11 watts, the per exceeding the TSO out under the TSO consequently, by 5.f "performance" 11 watt transmitter TSO 1 watt capability distinction of a "from the accomplist TSO box" as is sporder 8110.4C Coparagraph 6-9 is comaking non-TSO long term. Adjust the wording (and template) to with the 8110.4C	O is not called D; the paragraph definition, the er has a non-bility. The function that hed outside the pecified in HG 4 critical to function work ag in the TSO be consistent CHG 4 intent.	aspects perform template here. Ir commen commen watt tra output a watts do "non-TS transmin by the M extra wa implem TSO art simply minimu standard margin As such reference as incor 8110.40 change	nction(s). It is these of "functionality or ance" that the TSO is language refers to a the example the atter gives, as the atter identifies, an 11-ansmitter that must a minimum of 10 loses not have 1 watt of SO function", since atter power is covered MPS and since that att cannot be sented outside the atter cannot be sented outside the atter that a lower than the sented outside the atternance of the most of the most of the sented outside the above the minimum. If we do not view the sented template language assistent with Order of the connecessary.
19.	Garmin	6.g Page 5	There is a second reference to D not DO-178C. It would seem th of DO-178C would be appropria 178C were being used.	at Annex A	The second refere 178B should be e "RTCA/DO-178E RTCA/DO-178C	xpanded to 3 or		ne second reference to OO-178C in paragraph

Origina AIR-13	ating Office: 0	Document Descript TSO-C209	ion:	Project Lea Dara Gibso	ad/Reviewer n	Reviewing O	ffice:	Date of Review:
20.	Garmin	Page 6 inconsistent with Order 8110.4C CHG 5. additional guidance about what furnished data should be provided to an operator or repair station when the equipment includes a non-TSO function. The problematic guidance states "include one copy of the data in paragraphs 5.f.(1) through 5.f.(4)." This guidance is inconsistent with Order 8110.4C CHG 4. Order 8110.4C CHG 4 paragraph 6-9.b.(6) defines the FAA-industry agreed data that must be provided to an installer when equipment includes a non-TSO function.		ce about what build be erator or repair equipment GO oblematic include one in paragraphs f.(4)." This sistent with HG 4. Order baragraph 6-e FAA-industry must be staller when	detailed standard 8150.1C	guage and policy in paragraph 5.f is ized per FAA Order and represents the urrent policy on non-		
21.	Rockwell Collins France	3.a	In case of display of single funct equipment, what are the standard addressed? For the cited Airspethe proposed text implies applicated TSO-C2d, which does not addressed electronic display technical aspetelectronic airspeed display and consuperseded DO-178A and DO-1 it be expected that TSO-C2d and be applied? A similar question of posed for many singular TSO further than the standard posed for many singular than the standard posed for many singular than the standard posed for many singular than the standard posed for many singul	ds to be ed example, ation of ss the ects of an eites 60B. Would 1 TSO-C113a could be	Please provide clarifying text regarding the case of display of a single function, particularly how single function TSO equipment should alternatively be treated (e.g., TSO-C113a + function TSO?)		added to "Sensor single fu requiren	d. Dwing sentence was paragraph 3.a, requirements and nction equipment nents are located in pective TSO."
22.	Rockwell Collins	4.a	Paragraph 3.15 of SAE/AS6296 exist	does not	Paragraph 3.14 of should be referen		Accepted The para	d. graph reference has

Originating Office:	Document Description:	Project Lead/Reviewer	Reviewing Office:	Date of Review:
AIR-130	TSO-C209	Dara Gibson	_	

	France			marking.	been changed to 3.14.
23.	Rockwell Collins-CR	3.0	This section states that new models of EFIS equipment must meet the MPS qualification and documentation requirements of SAE AS6296 and SAE AS8034B. It is not clear whether the TSO applicant would be required to show compliance to both SAE documents in their entirety or only show compliance to certain sections of AS6296 and AS8034B as applicable. For example, Section 3 of TSO-C113a specified that airborne multipurpose electronic displays must meet the MPS qualification and documentation requirements in section 4 of SAE AS8034B along with the color requirements found in Appendix 1 of TSO-C113a.	To avoid confusion by the applicant, please consider identifying the section number(s) within both AS6296 and AS8034B and any applicable unique color requirements that apply to Section 3 of the draft EFIS Display TSO.	Partially Accepted. To remove any ambiguity, sections 3 and 4 of SAE/AS6296 were added to paragraph 3. Section 4 of AS8034B was also added.
24.	THALES Avionics SAS	Section 3, p.1	As mentioned in the TSO C-EFIS section 3(a): "this TSO is not intended to address the display of single function equipment (e.g., airspeed). Two functions are required as a minimum." List of functions covered by this TSO with link to SAE AS 6296 and appropriate applicable AS sections should be added in section 3, based on list given in Appendix A (A.2) of SAE AS 6296 with some updates (*). This approach should be equivalent to the one of TSO C165a (for example) which includes in section 3 (Table 1) functional	Table should be added in Section 3 of TSO C-EFIS with List of functions and applicable SAE AS 6296 sections for each function (refer to SAE AS 6296 Appendix A.2). (* Refer to text proposal in Table 1 below of this comment form)	Not Accepted. The legacy TSOs/MPS/MOPS are provided as a reference via the Declaration of EFIS Functions Form provided in SAE/AS6296.

Origina AIR-13	ating Office: 0	Document Descrip TSO-C209	tion:	Project Lea Dara Gibson	ad/Reviewer n	Reviewing O	ffice:	Date of Review:	<i>r</i> :
			description and applicable MPS for EMD equipment. All these not necessary implemented b two over the list.	functions are out minimum			Accepte		
25.	THALES Avionics SAS	Section 4(a), p.2	Section 3.15 of SAE AS 6296 do	oes not exist.	to section 3.14 of	Replace reference with reference to section 3.14 of SAE AS 6296 which addresses Identification.		d. graph reference has unged to 3.14.	ıS
26.	THALES Avionics SAS	Section 5(f)(3)	Wording "continued performand used in last published TSOs sho clarified.		Additional Note with definition of "continued performance" should be added.		Š		vith
27.	Boeing	Page: 1 Para: 3.a.	The proposed text states: a. Functionality. This TSO's state apply to equipment intended for electronic display in the flight of flight crew in 14 CFR Part 23, 2 aircraft. This TSO covers basic of standards (SAE/AS8034B) and supplication requirements (SAE/AS8034B) and supplication req	use as an eck by the 5, 27, and 29 display specific AS6296). e, but are not a, navigation, ag, rrain isplays. This for head-up ed to address uipment are required	The paragraph in new TSO could be of multiple individe (airspeed, altitude SAE/AS6296 expressors in its covered to the control of the covered to the covered	dual TSOs for e, etc.), but blicitly excludes	changed This TSO equipme an electr flight de 14 CFR aircraft. display s (SAE/A) displaye requiren Specific can inclu to, flight navigatio status, al	ch. 3.a. has been to the following, "D's standards apply nt intended for use a conic display in the ck by the flight crew Part 23, 25, 27, and This TSO covers bastandards [S8034B] and specified functions nents (SAE/AS6296) displayed functions ide, but are not limit instrumentation, on, engine and systematics, surveillance, ication, terrain	y to e as ew in d 29 pasic fic fic fic.

Origina AIR-13	ating Office: 0	Document Description TSO-C209	n:	Project Lea Dara Gibso	ad/Reviewer n	Reviewing O	ffice:	Date of Rev	view:
28.	Boeing	General	Add a statement clarifying whet TSO is intended to cover integra (e.g. pitot/static pressure sensors integrated airspeed/altitude displantation of the state of t	as follows:	An appendix for or requirements was C113a. This new be similar to C11 addition of "specirequirements" con	added to TSO- TSO appears to 3a with the ific application	other dis not prov up displa covered are requir This TSG sensor re does not single fu airspeed and sing requiren their res Not acce We will requiren revision SAE/AS requirem	ss, weather, and plays. This TS ide standards for ays. Two functivithin SAE/AS ired as a minim O does not addrequirements. The address the distriction equipments are located pective TSO." epted. consider addinguents in the next of the TSO and 6296. This nent was not in TSO or MPS.	O does or head-ons 66296 um. ress his TSO oplay of ent (e.g., rements ipment d in
29.	AIRBUS	4. MARKING PAGE 2	In the following sentence "paragraph 3.15 of SAE does not exist. (a) Mark at least one major permanently and legibly information in 14 CFR § and paragraph 3.15 of SAS6296.	/AS6296" component with all the § 45.15 (b)	"Paragraph 3.15 of SAE/AS6296" sh replaced by "para SAE/AS6296.	ould be	Accepted The para		e has

Origin AIR-13	ating Office: 0	Document Descr TSO-C209	iption:	Project Lead Dara Gibson		Reviewing O	ffice:	Date of Review:
30.	GAMA	3 Page 1	This TSO invokes AS 8034B, which currently already specified by TS	SO-C113a.	Suggest removing reference to AS 8034B as this is already covered in a separate TSO. Additionally, suggest explaining how this TSO and TSO-C113a are related. For example, TSO-C195b paragraph 3.a.(4) includes "Class A and B equipment authorized under this TSO must comply with TSO-C165a, Electronic Map Display Equipment for Graphical Depiction of Aircraft Position (Own-Ship) when implementing Surface Applications. This TSO shall take precedence where it differs from TSO-C165a."		explains documer "The har optical (EFIS dis SAE AS display I broad se are addre	e in paragraph 3 how the two hts are related. It states, dware, physical, and ocular) requirements of plays are addressed in 8034B. The EFIS requirements, for a t of aircraft functions, essed in SAE/AS6296."
31.	GAMA	3 Page 1	The paragraph references the ent documents of AS 6296 and AS 8 section 3.c only references section document.	3034B, but on 4 of each	Revise this section to clarify that only section 4 applies. For		To remo sections SAE/AS paragrap	Accepted. ve any ambiguity, 3 and 4 of 6296 was added to h 3. Section 4 of B was also added.
32.	32. GAMA 3.a, page 1		The term "application" is broad a used in the AS6296 to describe the functional aspects that would be this AS.	he covered by	In sentence starting "This T covers", replace "application with "functional". In sentent starting "Specific application replace "applications" with "functional requirements"		changed This TSO equipme an electr	d. oh 3.a. has been to the following, " O's standards apply to nt intended for use as onic display in the ck by the flight crew in

Origina AIR-13	ating Office: 0	Document Description: TSO-C209		Project Lead/Reviewer Dara Gibson				Office: Date of Review:	
							aircraft. display s (SAE/AS displayed requirem Specific can incluto, flight navigation status, all commun awareness other dismot proving the covered rare requirem their respective and single requirem their respectives.	18034B) and specific functions ents (SAE/AS6296). displayed functions de, but are not limited instrumentation, on, engine and system erting, surveillance, ication, terrain ss, weather, and/or plays. This TSO does de standards for headys. Two functions within SAE/AS6296 red as a minimum. O does not address quirements. This TSO address the display of action equipment (e.g., . Sensor requirements e function equipment ents are located in pective TSO."	
33.	GAMA	3.a, page 1	Sentence starting "Two functions" qualified with the where they comspecifically AS6296	ne from, re id	eplace "Two fun equired" with "Two entified in AS62 equired"	wo functions	Accepted See complanguage	ment 32 for new	
34.	GAMA	3.b, page 2	The sentence starting "Document taken from C-113a, but a suggeste improvement would be to bring in	the loss" is Ra	ationale: This TS secifically aimed sesn't have quite	at EFIS, so	Not acce		

Originating Office: AIR-130	Document Desc TSO-C209	cription:	Project Lead Dara Gibson		Reviewing O	ffice:	Date of Review:
		of Design Assurance Level as ha for recent TSO's such as C-194 which introduce the topic of desi assurance level.	or C-198 gn	of C-113a. Suggestion: Replace the sente "Document the lo the two following "Develop the equ least, the design a equal to the failur classification due function and malf Or (preferred): "You may utilize hazard assessmen outlined in SAE A Guidelines and M Conducting the Sa Assessment Proce Airborne Systems Equipment, to det appropriate failur classification. Do failure condition of for which the equ designed in accor paragraph 5.a.(4) Note, that for the there is also a nee another item in se	ss" with one of forms: ipment to, at issurance level e condition to loss of function." the functional t process ARP 4761, lethods for afety ess on Civil s and termine the e condition cument the classification ipment is dance with of this TSO." second form, ed to add		ilerplate and consistent ler 8150.1C.
35. GAMA	3.f	The words "RTCA, Inc. Docume RTCA/DO-254" do not need to be	ent oe italicized.	Rationale: minor consistency. Remove italics.		Accepted The italianormal f	cs were changed to

Origina AIR-13	ating Office: 0				Project Lead/Reviewer Dara Gibson		ffice:	Date of Review:
36.	Page 2 reference section 3.15 of the is no section 3.15. 7. GAMA 4.a. Section 3.14.d of SAE/AS 6			ndard. There	Change to 3.14. Section 3.14 provides identification requirements. Exclude section 3.14.d in			ngraph reference has unged to 3.14.
37.	O'AUVIN'	Page 2	assumed referenced section of 4 TSO) includes the statement to r with: "See Installation Manual (IM Declared EFIS Functions", o on the primary (most promin component of the EFIS. The Order 8150.1C TSO templa include a statement similar to the	a in the mark the unit (1) for r equivalent, ent) te does not	Routinely granted from TSO require the equipment wi as the equipment sufficient space to well as all other r markings (e.g., m and SW level, etc other TSOs). This granted through a similar to the exa 8150.1C ¶ 7-4.e.(paragraph 4.a of the TSO. Routinely granted deviations from TSO requirements to mark the equipment with lengthy text as the equipment does not have sufficient space to include this as well as all other required markings (e.g., multiple TSOs and SW level, etc. that appear in other TSOs). This deviation is granted through use of a marking similar to the example in Order 8150.1C ¶ 7-4.e.(4).(b) "See Inst MnI for Addtl TSO approvals		6296 3.14d states that alent marking is ole in lieu of marking, tallation Manual (IM) ared EFIS Functions." inple, marking the ent with "See IM for nctions" is equivalent. Formation is necessary the TSO allows functions to be d. One must know the syour equipment is g.
38.	GAMA	AMA 4.b 14CFR45.15(b) and AS6296 allo manufacturer's name or tradema allowance should exist in the TS		ırk. Similar	Rationale: althous consistent with the preferred to be contact the cited 14CFR and Suggestion: Replace "name" of trademark or sym	gh it's ue C-113a, it is onsistent with and AS6296.	least one permane all the ir 45.15(b) SAE/AS manufac compone trademan	cpted. ch 4.a states, "Mark at emajor component ently and legibly with a formation in 14 CFR § and paragraph 3.14 of 6296." This allows the enturer to mark a major ent with the name, rk or symbol. Marking ments in Paragraph 4.b

Origina AIR-13	ating Office: 0	Document Description TSO-C209	n:	Project Lea Dara Gibso	ad/Reviewer	Reviewing O	ffice:	Date of Re	view:	
39.	GAMA	5.a.(4)	If the suggested change of commadopted, then add the need to ideanalyzed failure condition classi	entify the	Rationale: for cor suggested replace comment #3. Suggestion: In 5.a(4) add a ne condition classific	ement text of ew "(d) Failure	easily re tools) an the articl may be i	nt 3 (38) was n	out hand ablies of ermined e.	
40.	GAMA	5.a.(4)(c) Page 3	Paragraph 5.a.(4)(c) states: (4) For each unique configurations software and airborne electron hardware, reference the following forms of the following forms o	ntially onsidering Many f SW and patible and inique that can exist. may be SW and/or nount of data nual that can	Reword 5.a.(4)(c) (4) For each resoftware and/resoftware and/resoftware and/resoftware ference the ference that the ference th	ange of or airborne dware, following:		uage used is te and consiste	I didr	ment [LRV1]: Why not accept? I't accept this because the boilerplate language funique configuration" and "and". If you want change I will.
41.	GAMA	5.f Page 4	TSO paragraph 5.f and its subpa include definition of non-TSO fu the data to be submitted to the A	unctions and	TSO paragraph 5. "Identify function performance cont	nality or	Not Acc Order 8	epted. 110.4C (Chg	5	

Originating Office: AIR-130	Document Description: TSO-C209	Project Lead/Reviewer R Dara Gibson		Reviewing Office:		Date of Review:
	TSO functions. This guidance i with Order 8110.4C CHG 4.	s inconsistent	article not evalua paragraph 3 of th non-TSO function term "performand definition of a no is inconsistent wi 8110.4C CHG 4 J 9.b.(1) and 6-9.b. regarding how to TSO function. The TSO should not be "performance". I difficulty if these used. For example requires a minimulation transmitter and a makes equipment at 11 watts, the prexceeding the TSO out under the TSO consequently, by 5.f "performance" 11 watt transmitter TSO 1 watt capal distinction of a "facing and a complist TSO box" as is sporder 8110.4C C paragraph 6-9 is comaking non-TSO long term. Adjust the wordin (and template) to	is TSO (that is, as)." Use of the be" in the n-TSO function the the Order baragraph 6-(3)(a) guidance define a nonse defined as it will create criteria are e, if a TSO am 10 watt company that is robust erformance O is not called O; the paragraph definition, the er has a nonsolity. The function that hed outside the pecified in HG 4 critical to function work and in the TSO	defines as "one a TSO-a perform (MPS), affect the TSO furthern 6.9.b.(3) requires submited declared requirer TSO furthern 1.5 furthern	rated) para 6-9.b.(1) a non-TSO function that is not covered by approved minimum ance standard does not support or he hosting article's faction(s), and could ally be implemented of the TSO article." more, Para by (b) of the order manufacturers to the manufacturer's diperformance ments for the non- metion(s). It is these of "functionality or mance" that the TSO he language refers to he example the meter gives, as the meter identifies, an 11- minimum of 10 hes not have 1 watt of so function", since ter power is covered MPS and since that att cannot be hented outside the

Origina AIR-13	ating Office: 0	Document Descrip TSO-C209	tion:	Project Lea Dara Gibson	nd/Reviewer ∩	Reviewing O	ffice:	Date of Review:
					with the 8110.4C CHG 4 intent. The second reference to DO-		simply minimustandard margin As such reference as incorn 8110.40	icle. Rather, it meets the TSO m performance d, with a 1-watt above the minimum. , we do not view the red template language asistent with Order C requirements. No necessary.
42.	GAMA	6.g Page 5	There is a second reference to D not DO-178C. It would seem th of DO-178C would be appropria 178C were being used.	at Annex A	The second refere 178B should be e "RTCA/DO-178E RTCA/DO-178C	xpanded to 3 or	Accepted Added the	Ť
43.	GAMA	6.g, page 5	Related to comment #4, the AC allows for the possibility of mor 178B or 178C. Revise to accoursystems using earlier versions or guidance.	re than just nt for legacy	Rationale: to be compared the suggestion in Suggestion: Replace "RTCA/DO-178C" "RTCA/DO-178C" "RTCA/DO-178C" "RTCA/DO-178C" Annex A, Process and Outputs by Swith the admitted "including all dath the applicable obj RTCA/DO-178C 178B Annex A, Pobjectives and O	comment #4. DO-178B or 'with C, or earlier' ng all data plicable CA/DO-178B objectives oftware Level." lly unwieldy: a supporting ectives of or RTCA/DO-trocess	Not acce	pted. It 4 was not accepted.

Originating Office: AIR-130	Document Description TSO-C209	1:	Project Lea Dara Gibso	ad/Reviewer n	Reviewing Of	ffice:	Date of Review:
44. GAMA	7.b Page 6	TSO paragraph 7.b contains wor inconsistent with Order 8110.4C		Software Level' RTCA/DO-178 is of Figure 8-1 Soft Documentation to Regulatory Appre TSO paragraph 7 additional guidan furnished data shiprovided to an opstation when the includes a non-Ts function. The proguidance states "copy of the data is 5.f.(1) through 5. guidance is incon Order 8110.4C CHG 4 9.b.(6) defines the agreed data that reprovided to an inequipment include.	s used, the data tware of Support oval." b includes ce about what ould be recator or repair equipment SO oblematic include one in paragraphs f.(4)." This sistent with HG 4. Order paragraph 6-te FAA-industry must be staller when	detailed standard 8150.1C	guage and policy in paragraph 5.f is ized per FAA Order and represents the urrent policy on non-

The content below is part of Thales' comment. See comment 24.

(*) Table 1: Extract of SAE AS 6296 Appendix A.2 that should be added with additional applicable sections for each function:

Originating Office:	Document Description:	Project Lead/Reviewer	Reviewing Office:	Date of Review:
AIR-130	TSO-C209	Dara Gibson		

Function Name	Applicable	Legacy TSO / MOPS	Declaration
	Requirements	(Reference Only)	(X, C, D, or
	Sections in SAE		I)
	AS 6296		
Airspeed	Error!	TSO-C2d / AS 8019	
	Reference		
	source not		
	found. , 5.1.1,		
	Appendix B		
Vertical Velocity (Rate of Climb)	4.1.2, 5.1.2	TSO-C8e / AS 8016A	
Altimeter	4.1.3	TSO-C10b / AS 392C /	
		AS 8009B	
Attitude (Bank and Pitch)	4.1.4	TSO-C4c / AS 396B /	
		AS 8001	
Direction Indicator	4.1.5	TSO-C5f / AS 8021	
		TSO-C6e / AS 8013A	
Max Allowable Airspeed	4.1.6	TSO-C46a / TSO-	
		C46a	
Mach	4.1.7	TSO-C95a / AS 8018	
Turn and Slip	4.1.8	TSO-C3e / AS 8004	
Airborne Low-Range Radio Altimeter	4.1.9	TSO-C87a / ED-30	
Automatic Flight Guidance and Control	4.1.10, 5.1.5	TSO-C198 / DO-325	
System			
Very High Frequency Omnidirectional	4.2.1	TSO-C40c / DO-196	
Range (VOR)			
Distance Measuring Equipment (DME)	4.2.2	TSO-C66c / DO-189	
Localizer	4.2.3	TSO-C36e / DO-195	
Glideslope	4.2.4	TSO-C34e / DO-192	
Marker Beacon	4.2.5	TSO-C35d / DO-143	
Automatic Direction Finding (ADF)	4.2.6	TSO-C41d / DO-179	

Originating Office:	Document Description:	Project Lead/Reviewer	Reviewing Office:	Date of Review:
AIR-130	TSO-C209	Dara Gibson		

Function Name	Applicable Requirements Sections in SAE AS 6296	Legacy TSO / MOPS (Reference Only)	Declaration (X, C, D, or I)
Stand-Alone Airborne Navigation Equipment Using the Global Positioning System Augmented By The Satellite Based Augmentation System	4.2.7	TSO-C146c / DO- 229D	
Flight Management System using Multi- sensor Inputs	4.2.8	TSO-C115c / DO- 283A	
Microwave Landing System VHF Radio	4.2.9 4.2.10	TSO-C104 / DO-177 TSO-C169a / DO- 186B	
HF Radio	4.2.11	TSO-C170 / DO-163	
Temperature*	4.3.1	TSO-C43c / AS 8005	
Fuel Flow*	4.3.2	TSO-C44d / AS 407C	
Manifold Pressure	4.3.3, 5.1.3	TSO-C45b / AS 8042	
Fuel, Oil, and Hydraulic Pressure	4.3.4	TSO-C47a / AS 408C	
Tachometer	4.3.5, 5.1.4	TSO-C49b / AS 404B	
Fuel and Oil Quantity	4.3.6	TSO-C55a / AS 405C	
Windshear Warning and Escape Guidance	4.4.1	TSO-C117a / TSO- C117a	
Weather and Ground Mapping Radar	4.4.2	TSO-C63d / DO-173 DO-220	
Airborne Passive Thunderstorm Detection	4.4.3	TSO-C110a / DO-191	
Optional Display Equipment for Weather and Ground Mapping Radar Indicators	4.4.4	TSO-C105 / DO-174	
Terrain Awareness and Ground Proximity*	4.5.1	TSO-C92c / DO-161A TSO-C151b / TSO- C151b	

Originating Office:	Document Description:	Project Lead/Reviewer	Reviewing Office:	Date of Review:
AIR-130	TSO-C209	Dara Gibson		

Function Name	Applicable Requirements Sections in SAE AS 6296	Legacy TSO / MOPS (Reference Only)	Declaration (X, C, D, or I)
Helicopter TAWS	4.5.2	TSO-C194 / DO-309	
Traffic Collision Avoidance System (TCAS I and II)	4.6.1	TSO-C118a / DO- 197A TSO-C119d / DO- 185B modified and DO-300A modified by the TSO	
Traffic Advisory System	4.6.2	TSO-C147a / DO- 197A as modified	

In addition, requirements in <u>Section 3</u> of SAE AS 6296 are also applicable whatever the function(s).